



IB MYP YEAR 5

Year 10 Standard Mathematics

Assessment
BOARD BASED ASSESSMENT

Name: Angel Hong (10 Peace)

Teacher: **Miss Luk**

Date of task:

Time allowed: **70 min**

Student's Performance in Different Criterion	
A	6

INSTRUCTIONS:

- ◆ Read the instructions for all questions carefully.
- ◆ Show all work, steps and proper units.
- ◆ Ask the teacher for scrap paper, but any work on the scrap paper will **NOT** be marked.
- ◆ The use of GDC is allowed.
- ◆ The use of **non-electronic dictionary** is allowed.

ASSESSMENT:

- ◆ Read the criteria descriptors carefully before you start your work. This will give you a clear understanding of what is required and what a quality piece of work for this task must include. This way you give yourself the best chance of achieving the highest level in this task.
- ◆ This task assesses Criteria **A**.

Criterion A: Knowledge and understanding

Achievement level	Task Specific Rubric	IBO Published Descriptor	Student's self-evaluation
0	The student does not reach a standard described by any of the descriptors given below.	The student does not reach a standard described by any of the descriptors given below.	(0-8)
1-2	The student can solve some simple problems.	The student attempts to make deductions when solving simple problems in familiar contexts.	
3-4	The student can solve most simple and some more complex problems.	The student sometimes makes appropriate deductions when solving simple and more-complex problems in familiar contexts	Teacher's Final Grade
5-6	The student can solve challenging problem correctly and most familiar problems along with all different types of problems.	The student generally makes appropriate deductions when solving challenging problems in a variety of familiar contexts.	(0-8)
7-8	The student can solve most challenging and most familiar problems along with all different types of problems.	The student consistently makes appropriate deductions when solving challenging problems in a variety of contexts including unfamiliar situations.	

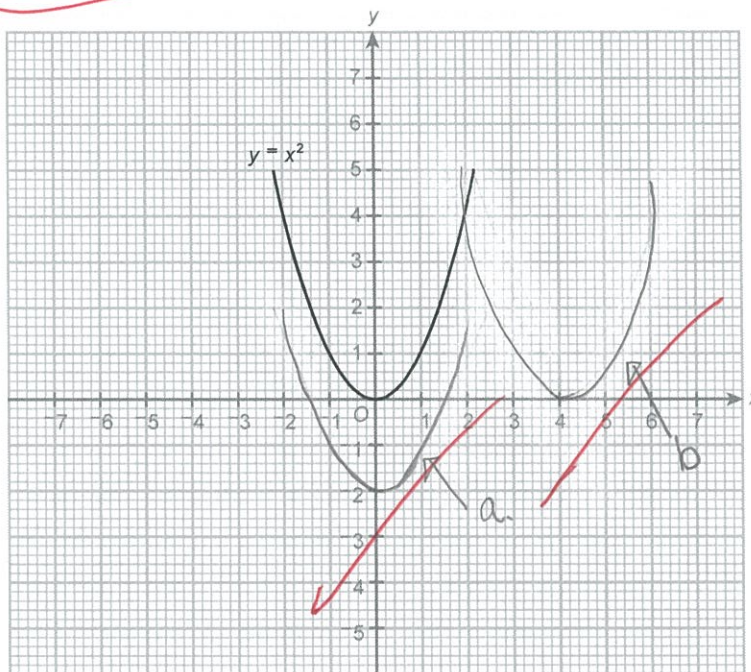
Simple Questions

1. The figure shows the graph of the function $y = x^2$. Describe the way of transforming the given graph to the graph of each of the following functions, and sketch the graph of each function on the same figure. (label each equation clearly)

(a) $y = x^2 - 2$

(b) $y = (x - 4)^2$

(c) $y = 2 + (x + 3)^2$



2. It is given that 4, 7, 10, 13, ... is an arithmetic sequence.

- (a) Find the general term of the sequence.
(b) Find the 25th term of the sequence.

Working:

a). General term of sequence (4, 7, 10, 13)

Let 4 be T_1

$$T_1 = a + (1-1)3 = 4$$

$$= a = 4$$

\therefore General term is $T_n = 4 + (n-1)3$

b). $T_n = 4 + (n-1)3$

$$T_{25} = 4 + (25-1)3$$

$$= 4 + 72$$

$$= 76$$

Answers:

(a) $T_n = 4 + (n-1)3 = ?$

(b) $T_{25} = 76$

More Complex Questions

3. Solve the equation $\frac{x^2}{4} - \frac{x}{3} = \frac{1}{3}$ by the quadratic formula. (Express the answers in surd form if necessary.)

Working:

$$x = \frac{-(-\frac{1}{3}) \pm \sqrt{(-\frac{1}{3})^2 - 4(\frac{1}{4})(-\frac{1}{3})}}{2(\frac{1}{4})}$$

$$x = \frac{\frac{1}{3} \pm \sqrt{\frac{1}{9} - (-\frac{1}{3})}}{\frac{1}{2}}$$

$$x = \frac{\frac{1}{3} \pm \sqrt{\frac{1}{9} + \frac{1}{3}}}{\frac{1}{2}}$$

$$x = \frac{\frac{1}{3} \pm \sqrt{\frac{4}{9}}}{\frac{1}{2}}$$

$$\frac{x^2}{4} - \frac{x}{3} - \frac{1}{3} = 0$$

$$x = \frac{\frac{1}{3} \pm \sqrt{\frac{16}{9}}}{\frac{1}{2}} \quad \text{or} \quad x = \frac{\frac{1}{3} - \sqrt{\frac{16}{9}}}{\frac{1}{2}}$$

$$x = 1.1 \quad \text{or} \quad x = 0.2$$

Answer:

$x = 1.1 \quad \text{or} \quad x = 0.2$

4. Simplify $\frac{72a^{3n-4}}{12a^{8-2n}}$, where n is an integer and a is a non-zero real number.

Working:

$$\begin{aligned} & \frac{72a^{3n-4}}{12a^{8-2n}} \\ &= \frac{72a^{3n-(-2n)-4-8}}{12a} \\ &= \frac{672a^{5n-12}}{12a} \\ &= 6a^{5n-12} \end{aligned}$$

Answer:

..... $6a^{5n-12}$

Challenging Questions

5. The area of a rectangle is 165 cm^2 . It is given that the width of the rectangle is 4 cm shorter than the length, find the length and the width of the rectangle.

Working:

165 cm^2

$$\begin{aligned} 165 &\div 2 \\ &= 82.5 \\ \text{Width} &= 4 \text{ cm shorter than length} \\ 82.5 - 4 &= 78.5 \\ \therefore \text{Width} &= 78.5 \end{aligned}$$

$$\therefore \text{Length} = 82.5$$

Answer:

..... Width = 78.5, Length = 82.5

6. Solve the equation $9^{7x-3} = 81(27^{2x-2})$.

Working:

$$9^{7x-3} = 81(27^{2x-2})$$

$$\frac{9^{7x-3}}{(27^{2x-2})} = 81$$

$$\frac{9^{7x-2x-3-(-2)}}{27} = 81$$

$$\frac{9^{5x-1}}{27} = 81$$

$$\frac{9^{5x-1}}{27} = 81$$

$$9^{5x-1} = 81 \div 3$$

$$9^{5x-1} = 27$$

$$x = \frac{1}{5} \text{ or } x = -27$$

Answer:

$$x = \frac{1}{5} \text{ or } x = -27$$

Unfamiliar Questions

7. Find the general term of the geometric sequence $8x, 32x^2, 128x^3, 512x^4, \dots$, where $x \neq 0$. (Express your answer in terms of x .)

Working:

$$8x, 32x^2, 128x^3, 512x^4$$

$$T_n = ar^{n-1}$$

$$\text{Let } 8x = T_1$$

$$T_1 = 8x \times 4x^{1-1}$$

$$= 8x \times 4x$$

$$= 32x^2$$

$$\therefore T_n =$$

$$\text{Let } 128x^3 = T_3$$

$$32x^2 = T_2$$

$$8x = T_1$$

$$\frac{128x^3}{32x^2} = \frac{32x^2}{8x}$$

$$4^{x^3-x^2} = 4^{x^2-x}$$

$$4^x = 4^x$$

$$x^2 = 4 - 4 = 1$$

$$x = 1$$

Answer:

$$x = 1$$

8. (a) Factorize $3x^2 - 8x - 3$ and $x^2 - x - 6$.

(b) Hence simplify $\frac{3(a^2)^n - 8a^n - 3}{(a^2)^n - a^n - 6}$.

Working:

8a. $3x^2 - 8x - 3 = 0$
 $(3x+1)(x-3) = 0$
 $x = -\frac{1}{3}$ or $x = 3$

$x^2 - x - 6$
 $(x-3)(x+2) = 0$
 $x = 3$ or $x = -2$

8b. $\frac{3(a^2)^n - 8a^n - 3}{(a^2)^n - a^n - 6}$

$= \frac{3(a^2)^n - (a^2)^n - 8a^n - a^n - 3 - 6}{(a^2)^n - a^n - 6}$
 $= \frac{-9a^n - 9}{(a^2)^n - a^n - 6}$

Answers:

- (a) $x = -\frac{1}{3}$ or $x = 3$ & $x = 3$ or $x = -2$
 (b) $\frac{-9a^n - 9}{(a^2)^n - a^n - 6}$

--End of Paper--